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THE CALIFORNIAN SPECIES OF THE GENUS NUTTALLINA.

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In the Manual of Conchology, Vol. 14, p. 280, after directing attention to the differences existing between *Nuttallina californica* Nutt. and *N. scabra* Rve., Mr. Pilsbry remarks that data are desirable concerning the areas of distribution of the two species along the Californian coast, especially between San Diego and Point Piedras Blancas, near San Simeon. Having collected numerous specimens of this genus at various points between Bolinas and Santa Barbara, I can offer the following notes.

A glance at a map of the West Coast will recall certain geographical features bearing upon the distribution of marine life. Going southward from San Francisco, the coast line which has followed a general southeasterly direction, bends abruptly to the east at Point Concepcion. As a result of this, the great ocean current from the north which has held to a course near the coast and parallel with it, all the way from Alaska, leaves it for the first time and flowing southward, is still further deflexed by the chain of the Santa Barbara islands. From Point Concepcion eastward, the ocean is warmer and the other conditions surrounding marine life are such as to warrant the expectation of an assemblage of species, different from those found north of the cape. While many species of mollusks are common to our whole Californian coast, *Terebra simplex*, *Drillia hemphilli*, *Marginella varia*, *Cypraea spadicea*, *Trivia solandri*, *Turritella cooperi*, *Norrisia norrisii*, *Trophon belcheri*, *T. triangulatus*, *Periploma planiuscula* and *Barbatia gradata* are species of a more southern fauna, found in Santa Barbara county, which do not as far

as we know pass Point Concepcion. Many other examples might be noted.

This is not the place to enter into a discussion of the West Coast marine faunal provinces. But it is interesting to note that as far as the material at hand gives evidence, the two West Coast species of *Nuttallina* are sharply divided by this natural boundary. At Carpinteria, ten miles east of Santa Barbara and at points west of that town, to Santa Anita, within ten miles of Point Concepcion, the specimens are uniformly *N. scabra*, as are also the more southernexa mples of the genus. Specimens collected at Point Sal, thirty-five miles northward from Point Concepcion, together with those collected at San Simeon, at Monterey, at Purissima and at points near San Francisco are uniformly *N. californica*. No intregrading forms were observed. While the external appearance is not always a sure guide to specific position, disarticulation of the plates has, in all cases examined, revealed the species with certainty.

A study of numerous specimens from the localities mentioned, shows the following differential characteristics, in addition to those cited by Mr. Pilsbry. Whether they would hold good in specimens from other localities or not, I do not know. In color *N. scabra* is externally more varied than *N. californica*. Specimens of the former from Santa Barbara are clouded and mottled with greenish upon a buff ground-tint, on the second, third, fifth and sixth valves. The remaining valves are much darker and less variegated. In single valves of *scabra*, viewed from above, the broad curving outline of the tegmentum on each side is bordered by a small spot of brown, placed centrally on the light blue surface of the sutural plates. This feature is constant in all of the specimens examined. In *N. californica* the spots are wholly absent, or in some cases replaced by indistinct clouds of a color darker than the surface of the sutural plates. Of course no one would separate the species because of these slight color differences, but taken in conjunction with the weightier points of difference furnished by the shape of the plates, sculpture and character of the girdle, they are interesting as showing how far these geographical races have become differentiated from the parent stock.